

**FLEET EFFECTIVENESS
PREDICTION STUDIES
AT A RECRUIT TRAINING COMMAND**

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*Navy Medical Neuropsychiatric Research Unit
San Diego, California*



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Fleet Effectiveness Prediction Studies at a Recruit Training Command

John A. Plag

Jerry M. Goffman

Navy Medical Neuropsychiatric Research Unit

San Diego, California

Commanding officers and members of their staffs are frequently required to make decisions regarding the retention or separation from service of "problem" enlistees. For example, John Doe is found to be negligent in the performance of his duties. He is taken to mast and his commanding officer is faced with a decision which may involve the awarding of a court martial, assigning extra duty, or possibly recommending an administrative type of service separation. In the final analysis, the commanding officer hopefully will make that decision which will increase the effectiveness of his operating unit and, at the same time, be of the greatest benefit to the enlistee himself. Couched in somewhat different terminology, the commanding officer will make an estimation of the odds for John Doe becoming an effective sailor if one or another administrative action is taken; and ultimately his decision will reflect the odds for Doe's effective performance which he, the commanding officer, attaches to different courses of action.

Many administrative decisions are made on Navy enlisted personnel which, in part, involve judgments of their future effectiveness or future value to the service. Unfortunately, such predictions of effectiveness are frequently only educated guesses, or at best are based upon the limited personal experiences of the officer responsible for the decisions. In other words, little information exists regarding the eventual military effectiveness of large numbers of enlistees for whom major decisions, *e.g.*, placement, training, or service separation, are made daily.

Determining the actuarial odds for effective naval performance among large samples of enlistees with different behavioral characteristics and in different fleet environments has been the goal of one of the research tasks assigned to the Navy Medical Neuropsychiatric Research Unit by the Bureau of Medicine and Surgery. Enlistee noneffectiveness, in a global sense, frequently involves psychiatric abnormalities. For this reason, it poses a medical problem.

It is generally agreed among personnel specialists that for enlistees to be considered effective they should not only complete their obligated tours of active duty, but also should be recommended for re-enlistment by their commanding officers. While this is not a stringent criterion of effectiveness, many enlistees do fail to meet it. As a matter

of fact, by this definition, only 72 percent of Navy enlistees on their first tour of duty can be considered as rendering effective performances. Conversely, 28 percent are either discharged prematurely or perform so poorly that their commanding officers are not able to recommend them for re-enlistment.

Research has not been completed for specifying the actuarial odds for effectiveness for enlistees in specific fleet environments, as in the example of John Doe. However, sets of probability figures have been derived for forecasting effectiveness during the initial phases of enlistment, *i.e.*, during the recruiting process and in recruit training. Research findings have indicated, for example, that a new enlistee who has completed 11 years of schooling, obtained an Armed Forces Qualification Test percentile score of 23, been expelled or suspended from school on two or more occasions, come from a family in which his parents are separated, and enlisted for four years of active duty has only 411 chances in 1000 of being an effective sailor. In other words, he would have approximately four chances in ten of completing his enlistment with a recommendation for re-enlistment. For other combinations of these variables, the actuarial odds are, of course, different.

Later, after the new enlistee has arrived at the training station and has completed his classification testing, his odds for effectiveness are slightly altered. For example, if he has completed 11 years of schooling, been expelled or suspended from school on two or more occasions, come from a family in which his parents are separated, obtained an Arithmetic Test score of 45 and a Mechanical Test score of 40, his odds are 511 out of 1000 of being an effective sailor during his four years of active duty. In general, as more information becomes available concerning the initial adjustment and performance of the new enlistee, predictions of his eventual naval effectiveness become more precise.

The purpose of this article is to illustrate how enlistees' predicted odds for effectiveness are altered as a result of their adaptation to one facet of the recruit training program. It is as a result of studying the fleet performance and adjustment of groups of enlistees with similar training experiences that information is accumulated which not only may have value for altering predictions of subsequent effectiveness, but which also may supply training personnel with feedback which can eventually be used as a basis for effecting changes in the training program.

As recruits, new enlistees with varying abilities, interests, and levels of emotional maturity are brought together in a training environment which is obviously alien to their former way of living, but one which is designed to mold their behavior into specific patterns which facilitate their eventual fleet effectiveness. Many new enlistees do not make

this transition from civilian to military life easily. Some (approximately three percent) perform so poorly in regular recruit training companies that they require temporary assignment to a special indoctrination company where they receive intensive instruction in the military aspects of training. Enlistees assigned to these companies remain attached to them on an average of ten days; and, following their reassignment to regular training companies, most (80 to 85 percent) eventually graduate from training.

But how well do they perform in the fleet? Are the specialized training experiences which they undergo in training sufficient to increase their motivation to the point where their fleet effectiveness is comparable to that of other enlistees? For the purpose of answering these questions and to illustrate the manner in which research of this type is conducted, the following study is described.

Research Design

In April of 1967, records of the special indoctrination company at the Recruit Training Command in San Diego were reviewed in order to obtain the names of enlistees who were transferred to that unit between October 1 and December 31, 1965. The selection of this time interval was based upon two considerations. First, a redefinition of the goals and purposes of the special indoctrination company and a revision in the standards for selection of the training staff had been made during the period just prior to October 1965. These changes were effected by the Recruit Training Command in an effort to improve the quality of instruction within the unit. Second, in order to provide sufficient time for evaluating the fleet effectiveness of the sample subjects, it was considered necessary for them to have been assigned to commands other than recruit training for a period of at least a year. By selecting the research sample during the last three months of 1965, it was possible to satisfy both of these conditions.

Previous research had indicated that recruits assigned to the special indoctrination company were enlistees having lower probability-for-effectiveness scores than average recruits. This new research study was not designed to compare this group's actual fleet effectiveness with that of average recruits. If it were, and findings indicated that they had a lower rate of effectiveness, it would not be possible to specify whether this difference was due to their initial lower probability scores or to factors connected with their special assignment and training. However, since one of the goals of the study was to assess whether probability scores should be altered for this special group of subjects, it was necessary to match these enlistees with a control group on the basis of their predicted odds for effectiveness.

In keeping with this design, two groups of subjects were selected as the research samples. The experimental group consisted of those recruits who graduated from training after completing an assignment in the special indoctrination company. The control group was comprised of enlistees who graduated from training without having been assigned to the special indoctrination company. Experimental and control subjects were matched on a man-to-man basis, depending upon their predicted fleet effectiveness scores.

The subject-by-subject matching of the experimental and control groups was carried out in the following manner. Data contained in records of the Recruit Training Command was used to calculate predicted effectiveness scores for enlistees in the experimental sample. The number of the regular recruit training company to which each of the experimental subjects had originally been assigned at the time of his entrance into recruit training was noted. Predicted effectiveness scores were then computed for all members of that particular regular training company, and the recruit whose score was nearest to that of the experimental subject was chosen as the matched control. Because both members of a matched pair were taken from the same regular training company, it could be assumed that, at least during the initial stages of training, they had both been exposed to relatively the same standards of instruction.

The variables used for the computation of the predicted effectiveness scores were:

- years of schooling completed prior to enlistment,
- Arithmetic and Mechanical Classification Test scores,
- number of expulsions and suspensions from school, and
- family stability.

The specific formula used in calculating these scores is contained in a report by the authors entitled "The Prediction of Four-Year Military Effectiveness from Characteristics of Naval Recruits" (*Military Medicine*, Vol. 131, No. 8, August 1966).

The actual military effectiveness of the sample subjects was evaluated 15 months subsequent to their graduation from recruit training. Criterion data for those subjects still "on board" consisted of commanding officer ratings of performance and adjustment. For those enlistees no longer attached to active duty commands, information was obtained from the Bureau of Naval Personnel as to the cause of separation and the type of discharge received. The duty status of the sample subjects and the commands to which those still on active duty were attached were ascertained from the enlisted master tape maintained by BuPers. For these latter subjects, commanding officers were requested to supply the following data:

- service schools completed by the subjects,
- commands to which enlistees had been attached since graduation from recruit training,
- all semiannual marks,
- record of disciplinary action,
- present rate and pay grade, and
- recommendation for re-enlistment.

The latter item was worded, "At this time would you recommend this man for re-enlistment? (Yes, No)" For the purposes of this study, a subject was considered to be noneffective if his commanding officer indicated that he was not recommended for re-enlistment or if he was no longer on active duty.

Results

During the period of October 1 through December 31, 1965, 154 recruits were assigned to the special indoctrination company at the Recruit Training Command, San Diego, 127 of which successfully completed training and were graduated into the fleet. Thus, the research sample was comprised of 254 enlistees (127 experimentals and 127 controls). Of these, fleet effectiveness data were obtained on 224 subjects. Missing criterion data of 30 matched pairs of experimental and control subjects necessitated their elimination from subsequent statistical analyses, leaving a sample of 97 pairs for whom fleet effectiveness comparisons could be made.

Approximately 15 months after graduation from recruit training, it was found that 23 of the 97 experimental subjects and 15 of the 97 control subjects were no longer attached to active duty commands. The reasons for their separations are shown in Table 1:

TABLE 1

Reason for Discharge	Experimental Subjects	Control Subjects
Misconduct	4	2
Unsuitability	9	2
Unfitness	3	2
Convenience of Government	4	1
Physical Disability	2	4
Desertion	1	4
Total	23	15

Of the 74 experimental subjects still in service 15 months after graduation from recruit training, 37 were rated by their commanding officers as not recommended for re-enlistment. The remaining 37 men were considered to be rendering effective performances. By contrast, of the 82 control subjects still in service 15 months after graduation from recruit training, only eight were rated as not recommended for re-enlistment.

By summing the number of enlistees within each group who had been discharged from service and the number not recommended for re-enlistment, rates of noneffectiveness were determined. For the experimental group, 60 of the 97 enlistees (approximately 62 percent) had rendered noneffective performances. For the control group, 23 of the 97 subjects (approximately 24 percent) were noneffective.

In terms of the subject-by-subject comparisons between the experimental and control groups, there were 48 pairs in which there was no difference in effectiveness; that is, both were classified as effective or both were classified as noneffective. For the remaining 49 pairs, there were 43 instances in which the control subject was classified as effective while his experimental match was classified as noneffective. In six instances, the reverse occurred. This preponderance of noneffectiveness among the experimental subjects is highly significant statistically.

Of the 48 pairs of subjects in which there was no difference in the effectiveness classification, eight enlistees had been discharged from service, leaving 40 pairs for whom commanding officer ratings of performance and adjustment were available. By comparing these 80 enlistees on the basis of the individual items which comprised the performance and adjustment questionnaire, it was possible to ascertain whether or not differences existed in the degree of effectiveness or noneffectiveness between the subjects in the two groups.

Table 2 shows the differences which existed in pay grade, semi-annual marks, and disciplinary record. These data show that the control subjects obtained a significantly higher pay grade and significantly higher semiannual marks than the experimental enlistees; but that no difference existed between the two groups with respect to disciplinary record.

Essentially then, enlistees who require assignment to special indoctrination companies in recruit training do not perform as well in the fleet as do other enlistees with similar background characteristics. Only 38 percent of the former group, as evaluated by commanding officers, render effective performances in the fleet, while 76 percent of the latter group are considered to be effective.

The question arises as to how these findings will alter predicted effectiveness scores. Also, will these scores, which were originally derived

TABLE 2

Measure	Number of Pairs				Approximate* Probability
	Control > Experimental	Control < Experimental	Control = Experimental	Total	
Pay Grade	14	5	21	40	<0.05
Semiannual Marks					
Performance	23	7	10	40	<0.01
Behavior	22	11	7	40	<0.05
Appearance	23	7	10	40	<0.01
Adaptability	19	7	14	40	<0.01
Discipline	10	9	21	40	N.S.

*Differences between the matched pairs of experimental and control subjects were tested for statistical significance by the Wilcoxon Matched-Pairs Signed-Ranks Test (Siegel, S. 1956. *Nonparametric Statistics for the Behavioral Sciences*, New York:McGraw-Hill).

for all recruits without respect to special indoctrination company assignment, still be useful for forecasting fleet effectiveness among enlistees who require this special training? The answers are reflected in the following data.

For the 97 experimental and 97 control subjects, the mean predicted effectiveness scores were 695 and 696 (out of 1000) respectively. These means are almost identical because it was on this basis that the subjects in the two groups were matched. For the experimental group, the 37 effective enlistees had a mean predicted effectiveness score of 763, while the 60 noneffective subjects had a mean score of 653. The correlation between predicted effectiveness score and actual fleet effectiveness for the experimental group was found to be .34, a statistically significant relationship.

On the basis of this correlation and on the basis of the actual fleet effectiveness of the experimental group, a new equation for predicting effectiveness for enlistees whose performances in recruit training normally require their assignment to the special indoctrination company has been written. The equation is: Effectiveness = 1.06 (Regular Predicted Eff. Score) - 355.7. Using this formula, an enlistee who begins regular recruit training with a predicted effectiveness score of 511, like the one cited earlier, would have only 185.96 chances, or approximately 186 in 1000, of rendering an effective performance in the fleet if he were assigned to the special indoctrination company and eventually graduated from recruit training ($185.96 = 1.06 (511) - 355.7$). On the basis of these findings it would seem to be a waste of training efforts to assign to the special training company those recruits who have

regular predicted effectiveness scores which are low, say, under 500 or 600.

Conclusions

Data have been presented to illustrate some of the research procedures which are employed in ascertaining the military effectiveness of groups of naval enlistees. In this particular study it was found that a high percentage of enlistees who perform poorly enough in recruit training to require assignment to a special indoctrination company are judged to be noneffective enlistees in the fleet. The results also suggest that some of the enlistees assigned to special indoctrination companies in recruit training, particularly those whose initial predicted effectiveness scores are low, have such meager odds for rendering acceptable performances in the fleet that their immediate release from service would probably be justified.

It should be pointed out that the data from this study do not permit an evaluation to be made of the relative value of the training procedures employed in special indoctrination companies. A determination of the effects of such special training would necessitate the utilization of a control group requiring special training but not permitted to receive it.

Establishing the fact that recruits assigned to special indoctrination companies have fleet effectiveness rates which are considerably below those of other recruits with similar background characteristics is but a first step in arriving at a highly valid formula for predicting service effectiveness. It is quite possible that other background variables may be uniquely valid for this group of enlistees or that different combinations of the same variables would yield more accurate predictions of effectiveness. To carry out such an analysis and to obtain reliable results would require a greater number of subjects than were available in this study. In this regard, separate regression analyses are being derived for predicting effectiveness among subjects grouped together on the basis of duty assignment and occupational specialty.

As more studies are conducted among groups of enlistees in specific training and fleet environments, it should eventually be possible to construct tables of probabilities of service effectiveness for use by commanding officers and personnel administrators in making decisions about enlistees at almost all stages of their service careers.

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